

Technical Report # 1301

**The Development of easyCBM Spanish Literacy
Assessments for Use in
Grades K-2**

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Abstract

In this study, we describe two studies used to select appropriate assessments to measure phonemic awareness, alphabetic principle, and fluency in the Spanish language for students receiving literacy instruction in Spanish. We first describe two studies in which we use linear regression and correlations to examine the appropriateness of different types of phonological awareness and early reading measures for first- and second-grade students receiving literacy instruction in Spanish. We report our findings from two studies carried out with two distinct populations: native English speakers enrolled in a Spanish language immersion program at a small suburban school and native Spanish speakers enrolled in a dual language immersion program at a large urban school (reported in the section identified as Initial Item Development Study). In both studies, performance on a measure of Syllable Sounds reading was the most significant predictor of oral reading fluency. We then provide alternate form reliability information for each of the easyCBM Spanish literacy measures (reported in the section identified as Reliability Study).

The Development of the easyCBM Spanish Literacy Assessments for Use in Grades K-2

Over the past decade, there has been a 65% increase in the number of Spanish-speaking students attending school in the United States (Woolfolk, 2004). In the 1999-2000 school year, 12.7% of all public and public charter schools in the United States included immersion programs (National Center for Education Statistics, 2002). In many of these schools, students received at least part of their instruction in Spanish. Educators at these schools are often faced with a dilemma if they want to use student performance assessments to monitor the progress students are making in developing literacy skills. Measures developed for use with English-speaking populations may not be appropriate for use with students receiving instruction in a language other than English. Our study addresses this concern. We examine the appropriateness of different measures of early literacy designed for use with students receiving instruction in Spanish.

Measuring Early Literacy Skills in English

One skill area commonly included in English literacy assessments is phonological awareness, or an understanding of the smaller units of speech contained within a word. In English, phonemic segmentation and blending are two areas of phonological awareness commonly assessed. However, teachers who work with students receiving literacy instruction in Spanish express dissatisfaction with these measures for their students, suggesting that syllables, rather than phonemes are more appropriate for students receiving literacy instruction in Spanish (Gonzalez, Alonzo, & Tindal, 2007).

The majority of research on the relationship between phonological awareness and more advanced reading skills focuses on students who speak English as a first language and are receiving literacy instruction in English. Early studies in this area show a correlation between

phonological awareness and more advanced reading skills (Share, Jorm & McClean, as cited in Ehri, 2001). Recent research on phonological awareness emphasizes the reciprocal influence view on phonological awareness and reading expressed by Stahl and Murray (1994). Specifically, at early stages of literacy acquisition, phonological awareness appears to predict reading ability. However, as more advanced reading skills develop, the relationship shifts, with more sophisticated phonological awareness skills resulting from individual differences in reading ability.

In a longitudinal study, Hogan, Catts and Little (2005) determined that phonological awareness in kindergarten predicted word reading ability in second grade, suggesting that between kindergarten and second grade, phonological awareness is a prerequisite to more advanced reading skills. In contrast, phonological awareness in second grade did not predict reading ability in fourth grade. Furthermore, results suggested that by second grade, the best predictor of word reading ability is word reading ability in previous years. These findings indicate that phonological awareness is an important predictor of reading ability at the earliest stages of literacy acquisition. However, as students' reading skills develop, the role of phonological awareness becomes less important. This conclusion supports the reciprocal influence theory, suggesting that the predictive power of phonological awareness declines over time, as students become more skilled readers.

Finding Appropriate Measures of Early Literacy in Spanish

Because English and Spanish are both alphabetic languages, it is likely that some understanding of the connection between written letters and sounds is necessary for learning to read in Spanish, as well. However, in designing assessments in Spanish, one cannot assume that findings related to specific measures of phonological awareness in English apply to students

receiving instruction in Spanish. Although Spanish and English are based on similar alphabets, they differ in orthographic consistency, or the degree to which the relationships between written letters (graphemes) and the sounds that they make (phonemes) are consistent and predictable. According to Wagner et al. (1997), “the importance of phonological processing abilities may vary as a function of the regularity of the correspondence between print and pronunciation” (p. 17-18).

The research on the relationship between phonological awareness and reading in Spanish is limited, although a correlation between phonological awareness and reading skills has been reported (Durgunoglu, Nagy & Hancin-Bhatt, 1993; Laefstadt & Gerber, 2005). However, the majority of research on phonological awareness in Spanish focuses on the potential for phonological awareness skills learned in Spanish to facilitate literacy acquisition in English. Although this is an important area of research, due to the common concern that Spanish literacy instruction will interfere with a student’s ability to become proficient in English (Crawford, 1998), research suggests that, contrary to this belief, education in the native language can have a positive impact on second language acquisition.

Durgunoglu, Nagy and Hancin-Bhatt (1993) investigated phonological awareness in Spanish-speaking first-graders who had received very limited instruction in English. Their results suggest that, in addition to predicting second language phonological awareness, the phonological abilities that Spanish-speaking children acquire in their native language contribute to their ability to recognize words in English. These findings imply that phonological awareness is a valuable skill for students who will ultimately develop literacy in both Spanish and English.

The apparent role of phonological awareness in predicting more advanced Spanish reading ability and the transferability of Spanish literacy skills to English suggest that

phonological awareness is an important area of instruction and assessment for students developing literacy in Spanish. However, care must be taken in determining how best to assess phonological awareness in Spanish.

One of the most fundamental differences between Spanish and English is the consistency of their orthographies. The Spanish language has a highly consistent orthography. According to DeFior, Martos and Cary (2002), “Spanish is a clear example of a shallow orthography. Each grapheme has a clear and precise phonemic translation” (p.137). In contrast, grapheme-phoneme correspondences in English are much less consistent, resulting in many irregularly spelled words. Because of the regularity of phonemes, literacy instruction in Spanish often emphasizes syllables, rather than individual phonemes (Alvarez, Carreiras & Perea, 2004; Carreiras & Perea, 2004; Jimenez Gonzalez & Garcia, 1995). According to Alvarez, Carreiras and Perea (2004), “most readers in Spanish have learned to read via a syllabic method, taking advantage of the fact that Spanish has clear syllable boundaries” (p. 430). This syllable-based instruction is supported by recent studies on the importance of the syllable as a unit of processing in Spanish. Alvarez, Carreiras and Perea’s (2004) study indicates that the syllable is an important unit of processing in Spanish, and that it exerts an effect on language comprehension at the level of phonological understanding.

The effect of syllable-level word properties on Spanish-speaking students’ reading skills implies that understanding the syllables within words represents an important component of literacy in Spanish. Considering this evidence for attention to the syllable, along with the relative consistency of the phonemes within Spanish syllables, it is logical to propose that phonemic awareness may not be as important in Spanish as it is in a less orthographically consistent language such as English. It is clear that phonemic awareness is a useful predictor of early

reading skills in English. Despite limited evidence, preliminary findings suggest that phonological awareness is an important early reading skill in Spanish as well. However, it does not necessarily follow that the same ways of measuring phonological awareness will be equally appropriate across the two languages. In our study, we examine the appropriateness of different early reading measures for use with elementary students receiving instruction in Spanish as opposed to English.

Methods: Initial Item Development Study

We used a correlational design to study the relative validity of the use of different measures of phonological awareness for first- and second-grade students receiving literacy instruction in Spanish. We conducted the study twice, with different study populations, to test the robustness of our findings across different samples with different language backgrounds. In both the initial (Study 1) and the replication study (Study 2), we administered the same measures of early literacy using the same standardized administration protocol. The different measures were administered in the same order across all participants in both studies.

Study 1: Native English Speakers Enrolled in a Spanish Immersion Program

Participants in our first study, conducted in the spring of 2007, included 48 first-grade and 50 second-grade students enrolled in a suburban Spanish language immersion school. Students in the first study were primarily native speakers of English, but all had received their literacy instruction entirely in Spanish as part of their immersion school experience. Trained researchers fluent in Spanish individually-administered five different early literacy measures to students in the first grade and six different early literacy measures to students in the second grade over the course of two days in the spring of 2007. First-grade students took the following five

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tests: Letter Sounds, Syllable Sounds, Phoneme Segmenting, Syllable Segmenting, and Word Reading Fluency.

The Letter Sounds measure consisted of 40 letters written on a chart in both upper case and lower case formats. Students were given 30 seconds to read as many of them as they could. On the Syllable Sounds test, students were shown a list of 40 syllables written on a chart and given 30 seconds to read as many of them as they could. The Phoneme Segmenting and Syllable Segmenting measures were presented orally. Assessors read a word in Spanish, and the students responded by breaking the word into its constituent phonemes or syllables, respectively. Students were given 60 seconds to complete these measures. Word Reading and Sentence Reading Fluency were the assessments that most closely resembled the task of ‘reading’. In the Word Reading test, students were presented with a list of words in a chart and given 30 seconds in which to read them. There were 20 possible points on this test. On the test of Sentence Reading Fluency, students were presented with a list of sentences on a piece of paper and given 30 seconds in which to read them. There were 110 possible points on this test. Table 1 provides examples of items from each of these measures.

Table 1

Examples of Items from Each of the Spanish Literacy Measures

Measure	Example Items
Letter Sounds	Student reads: A e S i a O R d I n D r ll t u L c M Ch
Syllable Sounds	Student reads: Da se So ri pa To Ra du Chi ni De ru lla
Phoneme Segmenting	Assessor says: ‘gato’ Student says: ‘g / a / t / o’
Syllable Segmenting	Assessor says: ‘gato’ Student says ‘ga / to’
Word Reading Fluency	Student reads: un lo a casa rojo dice porque cuando grande
Sentence Reading Fluency	Student reads: La gallina pone huevos. Ell perro ladra mucho.

In all cases, students were supplied the correct answer if they paused longer than 3 seconds on a particular item and asked to continue. In these cases, the item was scored incorrect. Student self-corrections were counted as correct. Raw scores “Total correct in a given amount of time” were used in all analyses. We analyzed the results by running correlations and linear regressions to test the strength of the relationship between the different early literacy measures and the measure used to assess student ability to read orally in Spanish.

Study 2: Native Spanish Speakers Enrolled in an English/Spanish Bilingual Program

Our replication study, conducted in January of 2008, included 72 students, divided into two approximately equal groups of students in grade 1 and 2. Students for the second study were native Spanish speaking students enrolled in an urban dual language bilingual immersion program. The program uses the *Estrellita's* phonics program starting in kindergarten. Students are first taught initial letter sounds. After they know the initial sounds, they are taught to blend each initial sound with "a", hence they learn syllables with "a". Next, they move on to learn syllables with "e". Once students have been taught this pattern, they generalize their learning to the other vowel sounds used in the creation of syllables without explicit instruction.

As in the initial study, all literacy instruction for these students had been provided in Spanish. Two changes were made in test administration from Study 1 to Study 2. To avoid a ‘ceiling effect’ on the two orally-administered tests (phoneme and syllable segmenting), we shortened the administration timing from one minute to 30 seconds. In addition, because first-grade students in Study 1 had done so well on the Word Reading measure, we added the Sentence Reading measure to the battery of tests administered to the first-grade students in Study 2. All other methodological features of the two studies were identical.

Results: Initial Item Development Study

Prior to analysis, all data were checked for accuracy. All values were examined to ensure they fell within the expected range of possible scores for each measure. No problems related to the data were found. All students who participated in both Study 1 and Study 2 completed all measures and were retained for analysis. We first present descriptive statistics then the results of the correlation and linear regression analyses.

Descriptive Statistics

First-grade students in Study 2 slightly outperformed their grade-level peers in Study 1 on almost all measures. They scored substantially higher on the Word Reading measure, reading on average almost 9 more words in a 30-second timing (see Table 2). Second-grade students in the two studies appeared more evenly matched. Students from Study 1 outperformed their grade-level peers on the measures of Letter Sounds and Phoneme Segmenting, while students from Study 2 outperformed their grade-level peers on all other measures (see Table 3).

Table 2

Descriptive Statistics for Study 1 and Study 2, Grade 1

Measure	Study 1			Study 2		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Letter Sounds	48	14.00	7.31	35	16.06	9.40
Syllable Sounds	48	20.44	7.89	35	24.94	9.63
Phoneme Segmenting	48	22.35	11.17	35	22.29	9.23
Syllable Segmenting	48	17.31	5.93	35	19.34	4.33
Word Reading	48	14.17	5.17	35	22.94	7.97
Sentence Reading	-NA-	-NA-	-NA-	34	24.12	11.67

Table 3
Descriptive Statistics for Study 1 and Study 2, Grade 2

Measure	Study 1			Study 2		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Letter Sounds	50	19.30	7.41	37	16.41	8.93
Syllable Sounds	50	30.98	6.49	37	31.57	7.59
Phoneme Segmenting	50	28.00	9.65	37	21.76	8.70
Syllable Segmenting	50	18.52	4.49	37	21.11	3.98
Word Reading	50	19.08	2.20	37	25.49	7.47
Sentence Reading	50	35.10	15.17	37	37.03	14.56

Examining the Relationship between Measures Using Correlations

Analysis of the correlations between the different measures revealed some differences in the two studies. For first-grade students, in Study 1 but not Study 2, performance on the measure of Letter Sounds was moderately positively correlated with performance on the measure of Syllable Sounds $r(48)=.46$, $p<.01$, Phoneme Segmenting $r(48)=.42$, $p<.05$, and Word Reading $r(48)=.31$, $p<.05$ (see Table 4). Student performance in the measure of Syllable Sounds was strongly positively correlated with student performance on the Word Reading measure in Study 1 $r(48)=.87$, $p<.01$, and moderately positively correlated with that measure in Study 2 $r(35)=.56$, $p<.01$. In Study 2, where we added the Sentence Reading measure, performance on that measure was also moderately positively correlated with performance on the Word Reading measure $r(35)=.57$, $p<.01$. No other first grade measures were significantly correlated in either study.

The relationship between the measures for students in second grade differed more substantially between the two studies. In Study 1, performance on the measures of Syllable Sounds was weakly positively correlated with performance on the measure of Phoneme

Segmenting $r(50)=.38$, $p<.01$; moderately correlated with the measure of Syllable Segmenting $r(50)=.42$, $p<.01$; and more strongly correlated with the measure of Word Reading $r(50)=.59$, $p<.01$ and Sentence Reading $r(50)=.69$, $p<.01$ (see Table 5). In contrast, in Study 2, the measure of Syllable Sounds was only positively correlated with the measures of Word Reading $r(37)=.67$, $p<.01$ and Sentence Reading $r(37)=.50$, $p<.01$, although—as in Study 1—these correlations were moderate to strong.

Table 4

Correlations Among the Grade 1 Measures in Study 1 ($n = 48$) & Study 2, Grade 1 ($n = 35$)

	Letter Sounds		Syllable Sounds		Phoneme Segmenting		Syllable Segmenting		Word Reading	
	1	2	1	2	1	2	1	2	1	2
Syllable Sounds	.46**	.28								
Phoneme Segmenting	.42**	.13	.33*	.01						
Syllable Segmenting	-.11	-.07	.05	-.04	.23	-.06				
Word Reading	.31*	.09	.87**	.56**	.21	.02	.19	.22		
Sentence Reading	NA	.06	NA	.45**	NA	-.10	NA	.11	NA	.57**

* $p < .05$

** $p < .01$

Table 5

Correlations Among the Grade 2 Measures in Study 1 (n = 50) & Study 2 (n = 37)

	Letter Sounds		Syllable Sounds		Phoneme Segmenting		Syllable Segmenting		Word Reading	
	1	2	1	2	1	2	1	2	1	2
Syllable Sounds	.37**	.40*								
Phoneme Segmenting	.15	.04	.38**	-.05						
Syllable Segmenting	.08	.08	.42**	.32	.45**	.19				
Word Reading	.20	.37*	.59**	.67**	.04	.26	.27	.39**		
Sentence Reading	.13	.42**	.69**	.50**	.39**	.28	.52**	.30	.54**	.86**

* $p < .05$ ** $p < .01$

While Study 1 showed no significant relationship between performance on the measure of Letter Sounds and Sentence Reading, Study 2 showed a moderate positive correlation between these two measures $r(37)=.42$, $p<.01$. Similarly Study 1 showed weak to moderate correlations between measures of Phoneme Segmenting and Syllable Segmenting, $r(50)=.45$, $p<.01$, and Phoneme Segmenting and Sentence Reading $r(50)=.39$, $p<.01$, but Study 2 indicated no significant correlation between performance on these measures. Finally, Study 2 indicated a moderate positive relationship between performance on the measures of Syllable Segmenting and Sentence Reading, $r(50)=.52$, $p<.01$, while Study 2 instead showed a moderate positive correlation between the measure of Syllable Segmenting and the measure of Word Reading $r(37)=.39$, $p<.01$, but not Sentence Reading.

Examining the Relationship between Measures Using Stepwise Linear Regression

In Study 1, in which the majority of the students were native English speakers enrolled in a Spanish immersion program and receiving all their literacy instruction in Spanish, we found that for students in first grade, the only measure that was a statistically significant predictor of student performance on the Word Reading Fluency test was the Syllable Sounds test. The other three measures dropped out of the regression equation. The Syllable Sounds measure provided a statistically significant prediction of student performance on the Word Reading test $F(1,47) = 138.31, p < .001$. The Syllable Sounds measure alone accounted for 75% of the variability in performance on the Word Reading measure. Table 6 presents the results of this regression analysis, including part and partial correlations.

Table 6

Word Reading Regression Summary for Grade 1, Study 1

Independent Variables	Unstandardized Coefficients		Standardized Coefficients		Partial and Part Correlations	
	B	Std. Error	Beta	t	Partial	Part
Syllable Sounds	0.57	0.05	.87	11.76	0.87	0.87
Constant	2.56	1.06		2.42		

For students in second grade, a combination of performance on the Syllable Sounds and Syllable Segmenting measures was a statistically significant predictor of student performance on the Sentence Reading Fluency test $F(2,49) = 28.07, p < .001$. These two measures accounted for 54% of the variance on the Sentence Reading measure. The other two measures dropped out of the regression equation. Table 7 presents the results of this regression analysis. An examination

of the part and partial correlations indicates that the Syllable Sounds measure accounted for almost twice the variance that the Syllable Segmenting measure accounted for.

Table 7

Sentence Reading Regression Summary for Grade 2, Study 1

Independent Variables	Unstandardized Coefficients		Standardized Coefficients	t	Partial and Part Correlations	
	B	Std. Error	Beta		Partial	Part
Syllable Sounds	1.34	0.25	0.57	5.29	0.61	0.52
Syllable Segmenting	0.96	0.37	0.28	2.62	0.36	0.26
Constant	-24.15	8.08		-2.99		

Replication of this study with a native Spanish speaking student population returned almost identical findings for the first-grade sample but slightly different findings for the second-grade students. As in Study 1, for the first-grade students, performance on the measure of Syllable Sounds was the only predictor of performance on either measure of reading fluency (see Table 8). The Syllable Sounds measure provided a statistically significant prediction of student performance on the Word Reading test $F(1,33) = 14.95$, $p < .001$.

Table 8

Word Reading Regression Summary for Grade 1, Study 2

Independent Variables	Unstandardized Coefficients		Standardized Coefficients	t	Partial and Part Correlations	
	B	Std. Error	Beta		Partial	Part
Syllable Sounds	0.46	0.11	.56	4.22	0.56	0.56
Constant	11.16	2.95		3.78		

The Syllable Sounds measure alone accounted for 31% of the variability in performance on the Word Reading measure.

Similar results were found when the early literacy measures were regressed onto the Sentence Reading measure. The Syllable Sounds measure provided a statistically significant prediction of student performance on the Sentence Reading test $F(1,33) = 8.05, p < .01$, accounting for 20% of the variability in performance on the Sentence Reading measure. All other possible predictive measures dropped out of the regression equation, indicating no statistically significant predictive relationship to the measures of Word or Sentence Reading fluency. Because we did not administer the Sentence Reading measure to the first-grade students in Study 1, the table includes only the result of the regression to the Word Reading measure to facilitate cross-study comparisons.

For the second-grade sample, however, the findings differed slightly from Study 1 to Study 2 (see Table 9). In Study 2, although performance on the Syllable Sounds measure again emerged as the most significant predictor of performance on the Sentence Reading measure (accounting for 25% of the variance in performance on the sentence measure), including the Phoneme Segmenting measure in the regression equation increased the variance accounted for substantially. Including both predictors in the equation accounted for 34% of the variance in student performance on the Sentence Reading measure. As in Study 1, however, examination of the part and partial correlations once more suggested the Syllable Sounds measure uniquely accounted for almost twice the variance as the other measure.

Table 9

Sentence Reading Regression Summary for Grade 2, Study 2

Independent Variables	Unstandardized Coefficients		Standardized Coefficients	t	Partial and Part Correlations	
	B	Std. Error	Beta		Partial	Part
Syllable Sounds	0.99	0.27	0.52	3.72	0.54	0.52
Phoneme Segmenting	0.51	0.23	0.31	2.20	0.35	0.31
Constant	-5.41	10.25		-0.53		

The results of the initial item development studies informed our work in developing the easyCBM Spanish literacy assessments of Syllable Segmenting, Syllable Sound Fluency, Word Reading Fluency, and Sentence Reading Fluency. A description of an initial study of these measures' reliability is provided next.

Methods: Reliability Study

In this section, we describe the methods used in studying alternate form reliability of the easyCBM Spanish measures. Data collected for this study were also used to provide additional information about the relation between the Spanish measures.

Setting and Participants

Data for this reliability study were gathered in December of 2011 from a convenience sample of classrooms whose teachers signed up to participate in response to a call for research participants posted on the easyCBM website. Teachers received a gift card for \$25 (Grades K and 2) or \$50 (Grade 1) for their participation, with the difference in compensation related to the number of measures students were administered. Student participants were all Native Spanish Speakers receiving at least some of their literacy instruction in Spanish. Students were

administered a series of Spanish-language assessments in one (Grades K and 2) or two days of testing. All assessments were given by the students' regular classroom teachers and/or instructional assistants with whom they had been working on a regular basis. All assessments were administered following a standardized written protocol for test administration. Students were given one minute to complete each form of each measure. Table 10 lists the measures administered in each grade.

Table 10

Measures Administered in the Spanish Assessment Reliability Study

Grade	Measures Administered (each X = 3 different forms administered to each student)			
	Syllable Segmenting	Syllable Reading	Word Reading	Sentence Reading
Kindergarten	X	X		
1	X	X	X	X
2			X	X

Each participating teacher was sent a packet of material containing testing materials (standardized administration instructions, student test materials, and test administrator materials) to use during the study (see Figure 1 for an example of one of the packets of material, for a first grade classroom). Teachers administered the measures at times they selected, but all tests were administered sometime during the same three-week testing window in December of 2011. Once all their students had completed all measures, teachers logged on to a secure website where they entered student data. No identifying information was collected on individual students or classrooms. Once all teachers had completed the study, the data were downloaded for analysis.

SPANISH CBM STUDY: Grade 1, Group 5

Note: Each teacher is assigned a group number. PLEASE use only the materials for your assigned group.

Instructions:

1. Prepare your testing materials in advance (one copy of student test materials, and enough copies of the Tester materials for each student in your class).
2. Let your students know that they will be working with you on a variety of reading activities (this is better than calling the materials ‘tests’ and raising their anxiety).
3. When you are ready to do the assessments, have your students work with you one at a time. Begin with Test 1 and move all the way through Test 12. Each test should be administered for just 60 seconds (one minute). Mark errors as the students are taking the tests, and be sure to mark where the student is when the time runs out.
4. After you have administered the tests to all of your students, enter their test results on the Spanish study website. You can use pseudonyms or code numbers rather than providing actual student names if you would like. Please be sure to enter the final scores (total correct ____ per minute) for each of the tests. Note that all test forms are labeled: Test 1 – Test 12. It is important that you administer the tests in this exact order, and that you enter the scores in the right columns, corresponding with the correct test number.
5. When you are finished, send an e-mail to Julie Alonzo (jalonzo@uoregon.edu) so we can get your information and send you a gift card as our thanks for your assistance.

Grade 1 Teachers will administer a total of 12 tests.

- 3 Syllable Segmenting Tests
- 3 Syllable Sounds Tests
- 3 Word Reading Fluency tests
- 3 Sentence Reading Fluency tests

Materials Needed:

1 copy, total, of the Student Test Materials (you can re-use these with multiple students)

1 copy of the Tester Test Materials for each student in your class

Stopwatch

Pencil

Clipboard

Figure 1. Example of instructions provided to teachers administering the measures.

Data Analysis

We calculated descriptive statistics (Mean, Minimum, Maximum and Standard Deviation) for each of the measures administered in this study. We then ran correlations between each of the measures for each grade. Finally, we ran a linear regression to evaluate the variance in the most challenging measure type at each grade level accounted for by each of the predictor variables administered at that grade level.

Results: Reliability Study

We organize the results of our reliability study by grade in this section. For ease of reference, we provide the narrative results in text, followed by the tables, organized by grade, with descriptive statistics reported first, followed by the results of our correlation analysis, and finally, our regression results.

Kindergarten Results

Sample size varied by measure, with a minimum of 18 and a maximum of 62 students' scores included in the sample. Table 11 presents the *n*, *M*, and *SD* for each of the measures administered to Kindergarten students in the reliability study. Results of the Kindergarten correlation analyses suggest very strong to moderately strong positive relations between alternate forms of the same measure type (see Table 12 for correlations between the Kindergarten Syllable Segmenting measures and Table 13 for correlations between the Kindergarten Syllable Reading measures), but little to no relation between the Kindergarten measures of Syllable Segmenting and Syllable Reading Fluency (see Table 14). These results are what would be expected if the two types of assessments measure two different constructs.

Grade 1 Results

Sample size varied by measure, with a minimum of 23 and a maximum of 63 students' scores included in the sample. Table 15 presents the *n*, *M*, and *SD* for each of the measures administered to Grade 1 students in the reliability study, along with the minimum and maximum scores recorded for each measure type. At Grade 1, we found moderate to strong correlations between alternate forms of the measures of Syllable Segmenting (see Table 16), with forms 1_6 and 1_7 having the weakest correlations to the other measures ($R^2 = .37 - .60$) and forms 1_5 and 1_6 having the strongest correlations ($R^2 = .82 - .93$). We found strong to very strong positive

correlations between alternate forms of the grade 1 measures of Syllable Reading (see Table 17), with forms 1_5 and 1_6 having the weakest correlations to the other measures ($R^2 = .58 - .87$) and the three benchmark forms (fall, winter, and spring) having the strongest correlations ($R^2 = .97 - .98$). We found uniformly very strong positive correlations between alternate forms of the measures of Word Reading Fluency (see Table 18), with correlations between all alternate forms above .92 ($R^2 = .92 - .98$) and between the alternate forms of the Sentence Reading Fluency measures (see Table 19), with correlations all above .96 ($R^2 = .96 - .99$).

At first grade, we found higher correlations between the measures of Syllable Segmenting and Syllable Reading ($R^2 = .46$) than we had found in our Kindergarten analyses. Syllable Segmenting exhibited roughly equivalent correlations to the First Grade Word Reading Fluency and Sentence Reading Fluency measures as well, with correlations of .44 and .46, respectively. Syllable Reading, however, was more highly correlated to both the Word Reading Fluency ($R^2 = .93$) and the Sentence Reading Fluency ($R^2 = .91$) measures. The highest correlation was found for Word Reading Fluency and Syllable Reading Fluency ($R^2 = .95$). Table 20 presents the correlation matrix for the Grade 1 measures.

Results of a multiple linear regression analysis, in which Sentence Reading Fluency was used as the dependent variable, indicated that the combination of Syllable Segmenting, Syllable Reading, and Word Reading Fluency was a significant predictor of student performance on the Sentence Reading Fluency measure $F(3,42) = 143.98, p < .001$. Together, the three predictor variables accounted for 91% of the variance in the Sentence Reading Fluency measure. Table 21 presents the results of this regression analysis.

Grade 2 Results

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Sample size varied by measure, with a minimum of 22 and a maximum of 108 students' scores included in the sample. Table 22 presents the n , M , and SD for each of the measures administered to Grade 2 students in the reliability study, along with the minimum and maximum scores recorded for each measure type. At Grade 2, we found very strong positive correlations between alternate forms of the measures of Word Reading Fluency ($R^2 = .90 - .98$) and between alternate forms of the measures of Sentence Reading Fluency ($R^2 = .93 - .98$). Tables 23 and 24 present these results for Word and Sentence Reading Fluency, respectively. These two measure types also correlated strongly with one another (See Table 24), with correlations ranging from .91 to .93.

Results of a linear regression analysis, in which Sentence Reading Fluency was used as the dependent variable indicated that Word Reading Fluency was a significant predictor of student performance on the Sentence Reading Fluency measure $F(1,106) = 678.09, p < .001$. Performance on the Word Reading Fluency measure accounted for 87% of the variance in the Sentence Reading Fluency measure at Grade 2. Table 26 presents the results of this regression analysis.

Table 11

Descriptive Statistics: easyCBM Spanish Measures, Kindergarten

	N	Minimum	Maximum	Mean	Std. Deviation
Syl Seg Fall	62	0	51	31.16	16.21
Syl Seg Winter	43	5	51	40.02	11.60
Syl Seg Spring	40	0	51	34.10	15.60
Syl Seg K_2	22	0	51	45.18	12.05
Syl Seg K_3	21	16	51	43.71	8.75
Syl Seg K_4	21	28	51	44.19	6.70
Syl Seg K_5	19	0	51	31.58	19.21
Syl Seg K_6	19	0	51	30.68	18.82
Syl Seg K_7	18	0	45	21.83	17.13

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Syl Seg K_8	18	0	48	19.94	17.89
Syl Seg K_9	22	0	51	42.50	12.39
Syl Rdg Fall	62	0	52	7.05	9.88
Syl Rdg Winter	43	0	66	5.70	11.83
Syl Rdg Spring	41	0	69	6.17	12.51
Syl Rdg K_2	22	0	44	5.82	10.64
Syl Rdg K_3	21	0	30	4.14	7.11
Syl Rdg K_4	21	0	30	4.29	7.48
Syl Rdg K_5	19	0	12	2.37	3.45
Syl Seg K_6	19	0	15	2.32	4.69
Syl Rdg K_7	18	0	29	7.17	7.56
Syl Rdg K_8	18	0	46	8.61	11.56
Syl Rdg K_9	22	0	48	6.05	11.45

Table 12

Correlations between easyCBM Spanish Syllable Segmenting Measures, Kindergarten

		Syl Seg Fall	Syl Seg Winter	Syl Seg Spring	Syl Seg K_2	Syl Seg K_3	Syl Seg K_4	Syl Seg K_5	Syl Seg K_6	Syl Seg K_7	Syl Seg K_8
Syl Seg Fall	Pearson Correlation Sig. (2-tailed) N	1									
Syl Seg Winter	Pearson Correlation Sig. (2-tailed) N	.91** .000 22	1								
Syl Seg Spring	Pearson Correlation Sig. (2-tailed) N	.84** .000 22	.92** .000 22	1							
Syl Seg K_2	Pearson Correlation Sig. (2-tailed) N	.57** .006 22			1						
Syl Seg K_3	Pearson Correlation Sig. (2-tailed) N		.70** .000 21			1					
Syl Seg K_4	Pearson Correlation Sig. (2-tailed) N		.61** .003 21			.54* .011 21	1				
Syl Seg K_5	Pearson Correlation Sig. (2-tailed) N			.83** .000 18				1			
Syl Seg K_6	Pearson Correlation Sig. (2-tailed) N			.81** .000 18				.88** .000 19	1		
Syl Seg K_7	Pearson Correlation Sig. (2-tailed) N	.74** .001 18								1	
Syl Seg K_8	Pearson Correlation Sig. (2-tailed) N	.62** .006 18								.76** .000 18	1
Syl Seg K_9	Pearson Correlation Sig. (2-tailed) N	.80** .000 22			.90** .000 22						

Table 13

Correlations between easyCBM Spanish Syllable Reading Measures, Kindergarten

		Syl Rdg Fall	Syl Rdg Winter	Syl Rdg Spr.	Syl Rdg K_2	Syl Rdg K_3	Syl Rdg K_4	Syl Rdg K_5	Syl Seg K_6	Syl Rdg K_7	Syl Rdg K_8
Syl Rdg Fall	Pearson Correlation Sig. (2-tailed) N	1									
Syl Rdg Winter	Pearson Correlation Sig. (2-tailed) N	.97** .000 22	1								
Syl Rdg Spring	Pearson Correlation Sig. (2-tailed) N	.98** .000 22	.99** .000 22	1							
Syl Rdg K_2	Pearson Correlation Sig. (2-tailed) N	.97** .000 22			1						
Syl Rdg K_3	Pearson Correlation Sig. (2-tailed) N		.93** .000 21			1					
Syl Rdg K_4	Pearson Correlation Sig. (2-tailed) N		.90** .000 21			.99** .000 21	1				
Syl Rdg K_5	Pearson Correlation Sig. (2-tailed) N			.61** .005 19				1			
Syl Seg K_6	Pearson Correlation Sig. (2-tailed) N			.58** .009 19				.87** .000 19	1		
Syl Rdg K_7	Pearson Correlation Sig. (2-tailed) N	.78** .000 18								1	
Syl Rdg K_8	Pearson Correlation Sig. (2-tailed) N	.83** .000 18								.95** .000 18	1
Syl Rdg K_9	Pearson Correlation Sig. (2-tailed) N	.98** .000 22			.99** .000 22						

Table 14

Correlations between easyCBM Spanish Syllable Segmenting and Syllable Reading Fluency, Kindergarten

		Syl Rdg Fall	Syl Rdg Winter	Syl Rdg Spring	Syl Seg Fall	Syl Seg Winter	Syl Seg Spring
Syl Rdg Fall	Pearson Correlation		.97**	.98**	.24	.05	.11
	Sig. (2-tailed)	1	.000	.000	.066	.842	.621
	N		22	22	62	22	22
Syl Rdg Winter	Pearson Correlation			.99**	.16	.07	.11
	Sig. (2-tailed)		1	.000	.466	.661	.623
	N			22	22	43	22
Syl Rdg Spring	Pearson Correlation				.13	.01	.17
	Sig. (2-tailed)			1	.558	.976	.295
	N				22	22	40
Syl Seg Fall	Pearson Correlation					.91**	.84**
	Sig. (2-tailed)				1	.000	.000
	N					22	22
Syl Seg Winter	Pearson Correlation						.92**
	Sig. (2-tailed)					1	.000
	N						22

**. Correlation is significant at the 0.01 level (2-tailed).

Table 15

Descriptive Statistics: easyCBM Spanish Measures, Grade 1

	N	Minimum	Maximum	Mean	Std. Deviation
Syl Seg 1_Fall	47	4	56	31.94	12.627
Syl Seg 1_Win	24	25	55	45.67	7.716
Syl Seg 1_Spr	63	10	56	44.29	11.116
Syl Seg 1_5	39	12	56	49.38	10.099
Syl Seg 1_6	39	9	56	49.31	10.071
Syl Seg 1_7	23	13	56	40.87	11.948
Syl Seg 1_8	22	23	56	44.41	10.751
Syl Rdg 1_Fall	48	3	77	38.06	18.522
Syl Rdg 1_Win	24	4	79	47.00	19.867
Syl Rdg 1_Spr	63	1	82	41.17	20.526
Syl Rdg 1_5	39	2	78	40.15	23.044
Syl Rdg 1_6	39	2	80	40.28	23.785
Syl Rdg 1_7	24	7	81	33.54	20.962
Syl Rdg 1_8	23	10	83	37.91	24.153
WRF 1_Fall	48	1	62	25.02	15.690
WRF 1_Win	24	2	62	31.25	14.988
WRF 1_Spr	63	0	63	27.29	16.299
WRF 1_5	39	0	58	27.82	18.714
WRF 1_6	39	0	60	27.72	19.272
WRF 1_7	24	0	62	21.25	15.301
WRF 1_8	23	0	60	22.04	14.962
SRF 1_Fall	49	0	79	24.78	20.425
SRF 1_Win	24	3	86	36.25	23.454
SRF 1_Spr	63	0	93	35.19	23.784
SRF 1_5	39	0	89	31.49	22.737
SRF 1_6	39	0	75	30.23	22.836
SRF 1_7	24	0	67	21.71	19.789
SRF 1_8	23	0	60	21.57	16.852

Table 16

Correlations between easyCBM Spanish Syllable Segmenting Measures, Grade 1

		Syl Seg 1_Fall	Syl Seg 1_Win	Syl Seg 1_Spr	Syl Seg 1_5	Syl Seg 1_6	Syl Seg 1_7	Syl Seg 1_8
Syl Seg 1_Fall	Pearson Correlation Sig. (2-tailed) N	1	.70** .000 24	.61** .002 24			.41 .066 21	.37 .101 21
Syl Seg 1_Win	Pearson Correlation Sig. (2-tailed) N		1	.63** .001 24				
Syl Seg 1_Spr	Pearson Correlation Sig. (2-tailed) N			1	.82** .000 39	.83** .000 39		
Syl Seg 1_5	Pearson Correlation Sig. (2-tailed) N				1	.93** .000 39		
Syl Seg 1_6	Pearson Correlation Sig. (2-tailed) N					1		
Syl Seg 1_7	Pearson Correlation Sig. (2-tailed) N						1	.60** .004 21

**. Correlation is significant at the 0.01 level (2-tailed).

b. Cannot be computed because at least one of the variables is constant.

Table 17

Correlations between easyCBM Spanish Syllable Reading Measures, Grade 1

		Syl Rdg 1_Fall	Syl Rdg 1_Win	Syl Rdg 1_Spr	Syl Rdg 1_5	Syl Rdg 1_6	Syl Rdg 1_7	Syl Rdg 1_8
Syl Rdg 1_Fall	Pearson Correlation Sig. (2-tailed) N	1	.95** .000 24	.93** .000 24			.87** .000 23	.80** .000 22
Syl Rdg 1_Win	Pearson Correlation Sig. (2-tailed) N		1	.97** .000 24				
Syl Rdg 1_Spr	Pearson Correlation Sig. (2-tailed) N			1	.98** .000 39	.96** .000 39		
Syl Rdg 1_5	Pearson Correlation Sig. (2-tailed) N				1	.97** .000 39		
Syl Rdg 1_6	Pearson Correlation Sig. (2-tailed) N					1		
Syl Rdg 1_7	Pearson Correlation Sig. (2-tailed) N						1	.90** .000 23

**. Correlation is significant at the 0.01 level (2-tailed).

b. Cannot be computed because at least one of the variables is constant.

Table 18

Correlations between easyCBM Spanish Word Reading Fluency Measures, Grade 1

		WRF 1 Fall	WRF 1 Win	WRF 1 Spr	WRF 1 5	WRF 1 6	WRF 1 7	WRF 1 8
WRF 1_Fall	Pearson Correlation		.97**	.96**			.94**	.92**
	Sig. (2-tailed)	1	.000	.000			.000	.000
	N		24	24			23	22
WRF 1_Win	Pearson Correlation			.96**				
	Sig. (2-tailed)		1	.000				
	N			24				
WRF 1_Spr	Pearson Correlation				.97**	.96**		
	Sig. (2-tailed)			1	.000	.000		
	N				39	39		
WRF 1_5	Pearson Correlation					.98**		
	Sig. (2-tailed)				1	.000		
	N					39		
WRF 1_6	Pearson Correlation							
	Sig. (2-tailed)					1		
	N							
WRF 1_7	Pearson Correlation							.97**
	Sig. (2-tailed)						1	.000
	N							23

**. Correlation is significant at the 0.01 level (2-tailed).

b. Cannot be computed because at least one of the variables is constant.

Table 19

Correlations between easyCBM Spanish Sentence Reading Fluency Measures, Grade 1

		SRF 1_Fall	SRF 1_Win	SRF 1_Spr	SRF 1_5	SRF 1_6	SRF 1_7	SRF 1_8
SRF 1_Fall	Pearson Correlation		.99**	.97**			.97**	.96**
	Sig. (2-tailed)	1	.000	.000			.000	.000
	N		24	24			25	24
SRF 1_Win	Pearson Correlation			.98**				
	Sig. (2-tailed)		1	.000				
	N			24				
SRF 1_Spr	Pearson Correlation				.98**	.98**		
	Sig. (2-tailed)			1	.000	.000		
	N				39	39		
SRF 1_5	Pearson Correlation					.98**		
	Sig. (2-tailed)				1	.000		
	N					39		
SRF 1_6	Pearson Correlation							
	Sig. (2-tailed)					1		
	N							
SRF 1_7	Pearson Correlation							.96**
	Sig. (2-tailed)						1	.000
	N							24

**. Correlation is significant at the 0.01 level (2-tailed).

b. Cannot be computed because at least one of the variables is constant.

Table 20

Correlations between easyCBM Spanish Syllable Segmenting, Syllable Reading, Word Reading, and Sentence Reading Fluency Measures, Grade 1

		Syl Seg 1_Fall	Syl Rdg 1_Fall	WRF 1_Fall	SRF 1_Fall
Syl Seg 1_Fall	Pearson Correlation		.46**	.44**	.46**
	Sig. (2-tailed)	1	.001	.002	.001
	N		46	46	47
Syl Rdg 1_Fall	Pearson Correlation			.93**	.91**
	Sig. (2-tailed)		1	.000	.000
	N			48	48
WRF 1_Fall	Pearson Correlation				.95**
	Sig. (2-tailed)			1	.000
	N				48

** . Correlation is significant at the 0.01 level (2-tailed).

Table 21

Regression Analysis Results: easyCBM Spanish Measures Grade 1

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	-7.986	2.896		-2.757	.009			
	Syl Seg 1_Fall	.055	.083	.034	.657	.515	.46	.10	.03
	Syl Rdg 1_Fall	.125	.140	.113	.895	.376	.90	.14	.04
	WRF 1_Fall	1.077	.163	.832	6.611	.000	.95	.71	.31

a. Dependent Variable: SRF 1_Fall

Table 22

Descriptive Statistics: easyCBM Spanish Measures Grade 2

	N	Minimum	Maximum	Mean	Std. Deviation
WRF 2_Fall	108	6	96	34.00	15.858
WRF 2_Win	25	8	63	34.76	18.173
WRF 2_Spr	31	8	91	40.39	19.221
WRF 2_2	35	18	84	39.26	16.121
WRF 2_3	25	4	69	38.80	21.329
WRF 2_4	25	4	72	36.64	20.802
WRF 2_5	31	10	92	44.48	21.309
WRF 2_6	31	7	90	41.84	21.650
WRF 2_7	22	5	64	29.77	16.110
WRF 2_8	22	5	70	27.73	15.887
WRF 2_9	35	17	85	38.43	17.813
SRF 2_Fall	108	3	117	46.43	24.621
PRF 2_Win	25	3	109	51.04	30.477
PRF 2_Spr	31	8	164	56.90	37.934
PRF 2_2	35	12	136	54.34	31.011
PRF 2_3	25	4	104	56.32	32.383
PRF 2_4	25	5	115	59.80	33.953
PRF 2_5	31	9	187	61.90	39.427
PRF 2_6	31	8	176	66.29	37.397
PRF 2_7	22	3	93	35.77	25.790
PRF 2_8	22	8	113	37.82	25.403
PRF 2_9	35	14	123	52.69	27.462

Table 23

Correlations between easyCBM Spanish Word Reading Fluency Measures, Grade 2

		WRF 2_Fall	WRF 2_Win	WRF 2_Spr	WRF 2_2	WRF 2_3	WRF 2_4	WRF 2_5	WRF 2_6	WRF 2_7	WRF 2_8	WRF 2_9
WRF 2_Fall	Pearson Correlation Sig. (2-tailed) N	1			.95** .000 35					.93** .000 22	.90** .000 22	.96** .000 35
WRF 2_Win	Pearson Correlation Sig. (2-tailed) N		1			.97** .000 25	.96** .000 25					
WRF 2_Spr	Pearson Correlation Sig. (2-tailed) N			1				.96** .000 31	.96** .000 31			
WRF 2_2	Pearson Correlation Sig. (2-tailed) N				1							.96** .000 35
WRF 2_3	Pearson Correlation Sig. (2-tailed) N					1	.97** .000 25					
WRF 2_4	Pearson Correlation Sig. (2-tailed) N						1					
WRF 2_5	Pearson Correlation Sig. (2-tailed) N							1	.98** .000 31			
WRF 2_6	Pearson Correlation Sig. (2-tailed) N								1			
WRF 2_7	Pearson Correlation Sig. (2-tailed) N									1	.97** .000 22	

**. Correlation is significant at the 0.01 level (2-tailed).

a. Cannot be computed because at least one of the variables is constant.

Table 24
Correlations between easyCBM Spanish Sentence Reading Fluency Measures, Grade 2

		SRF 2_Fall	SRF 2_Win	SRF 2_Spr	SRF 2_2	SRF 2_3	SRF 2_4	SRF 2_5	SRF 2_6	SRF 2_7	SRF 2_8	SRF 2_9
SRF 2_Fall	Pearson Correlation Sig. (2-tailed) N	1			.97** .000 35					.96** .000 22	.93** .000 22	.98** .000 35
SRF 2_Win	Pearson Correlation Sig. (2-tailed) N		1			.97** .000 25	.98** .000 25					
SRF 2_Spr	Pearson Correlation Sig. (2-tailed) N			1				.97** .000 31	.95** .000 31			
SRF 2_2	Pearson Correlation Sig. (2-tailed) N				1							.97** .000 35
SRF 2_3	Pearson Correlation Sig. (2-tailed) N					1	.98** .000 25					
SRF 2_4	Pearson Correlation Sig. (2-tailed) N						1					
SRF 2_5	Pearson Correlation Sig. (2-tailed) N							1	.98** .000 31			
SRF 2_6	Pearson Correlation Sig. (2-tailed) N								1			
SRF 2_7	Pearson Correlation Sig. (2-tailed) N									1	.93** .000 22	

** . Correlation is significant at the 0.01 level (2-tailed).

a. Cannot be computed because at least one of the variables is constant.

Table 25 <i>Correlations between easyCBM Spanish Word Reading Fluency & Sentence Reading Fluency Measures, Gr 2</i>				
		SRF 2_Fall	SRF 2_Win	SRF 2_Spr
WRF 2_Fall	Pearson Correlation	.93**		
	Sig. (2-tailed)	.000		
	N	108		
WRF 2_Win	Pearson Correlation		.91**	
	Sig. (2-tailed)		.000	
	N		25	
WRF 2_Spr	Pearson Correlation			.93**
	Sig. (2-tailed)			.000
	N			31

Table 26

Regression Analysis: easyCBM Spanish Measures, Grade 2

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.664	2.078		-1.282	.203
	WRF 2_Fall	1.444	.055	.930	26.040	.000

a. Dependent Variable: SRF 2_Fall

Discussion

In developing assessments for students receiving literacy instruction in Spanish, we must consider the unique properties of the Spanish language. Early literacy assessments developed for use with students receiving instruction in English may not be valid for use with students receiving instruction in Spanish (Alvarez, Carreiras, & Perea, 2004). As schools become more focused on using assessment data to guide their instructional decision-making, selecting appropriate measures is paramount. Our findings may help provide insight into this important area of research.

The findings of this study consistently suggest that the Syllable Sounds test might be a good initial measure to use to track the progress of first grade students receiving literacy instruction in Spanish. In our initial study, we found that first and second grade students' performance on the Syllable Sounds Assessment correlated with their performance on the Word Reading Assessment. This result was found for students receiving literacy instruction in Spanish whether they spoke English as a first language or Spanish as a first language. Furthermore, the Syllable Reading Assessment was found to be a strong predictor of performance on the Word and Sentence Reading Assessments for both grade levels and native language groupings. These findings suggest that the Syllable Reading Assessment may be the most useful measure for assessing early reading skills in students receiving literacy instruction in Spanish.

The Syllable Segmenting Assessment was also found to be an indicator of reading ability for some groups of students. For second grade students in our initial study who spoke Spanish as a native language, the Syllable Segmenting Assessment was correlated with scores on the Word Reading Assessment. Similarly, for second grade students who spoke English as a first language,

a combination of the Syllable Reading and Syllable Segmenting Assessments was the best predictor of performance on the Sentence Reading Assessment. These findings suggest that the Syllable Segmenting Assessment may be useful as an early reading measure for second grade students. The usefulness of this measure should be researched further.

The fact that these syllable-level measures were the most consistent predictors of performance on the reading measures used in this study suggests that syllable knowledge may be an important pre-reading skill for students learning to read in Spanish. These findings support teachers' statements that the syllable is the basis of Spanish literacy instruction. Several teachers surveyed by Gonzalez, Alonzo and Tindal (2007) reported that Spanish literacy instruction emphasizes the syllable, rather than the phoneme and that Spanish literacy assessment should parallel instruction. The data from this study support the idea that syllable-level measures are more representative of the instructional methods that are used in Spanish literacy programs.

In general, measures assessing smaller units of language, specifically the Letter Sounds Assessment and the Phoneme Segmenting Assessment, did not correlate as strongly with measures of reading fluency as the corresponding syllable-level measures. However, the study yielded some evidence that these assessments predict reading skills for students receiving literacy instruction in Spanish. For first-grade students for whom English was a first language, a correlation was found between the Letter Sounds Assessment and the Word Reading Assessment. Additionally, a correlation was found between the Phoneme Segmenting Assessment and the Sentence Reading Assessment. Because these students were native English speakers, these correlations may be related to these students' exposure to English in the home. Students' performance on these assessments may have been influenced by their exposure to English letter sounds when learning to speak English.

However, some findings suggest that an understanding of phonemes is related to reading fluency in students for whom Spanish is the first language. For second-grade students for whom Spanish is the first language, performance on the Letter Sounds Assessment correlated with performance on the Sentence Reading Assessment. Additionally, we found that when predicting sentence reading fluency in second grade students for whom Spanish is the first language, a combination of the Syllable Sounds and the Phoneme Segmenting Assessments is a more useful predictor of reading fluency than the Syllable Sounds Assessment alone. Thus, for older students who speak Spanish as a first language, awareness of letter sounds and phonemes may have some relation to literacy development. These data support initial findings that phonological awareness may be an important early literacy skill in Spanish (Durgunoglu, Nagy & Hancin-Bhatt, 1993; Laefstadt & Gerber, 2005). However, further research is needed to determine whether this relationship between smaller units of language and reading fluency appears consistently.

Although some of the findings suggest that the Letter Sounds and Phoneme Segmenting Assessments predict reading fluency in students receiving literacy instruction in Spanish, the evidence for the usefulness of these assessments is not as strong as for the syllable level assessments. Particularly, the Syllable Reading Assessment consistently shows up as the strongest predictor of reading fluency for both age and language groups. Thus, the results of these studies suggest that knowledge of the syllable may be the most important factor in predicting Spanish literacy development.

Limitations

As with all research, our study has limitations that may limit the generalizability of our findings. First, the number of participants in both Study 1 and Study 2 was fairly small. In addition, participants were not randomly selected for participation in the study. Instead, we

worked with convenience samples from two schools within the same state. At each school, we worked with only four teachers: two from first grade; two from second grade. Thus, it is possible that our results are confounded by the similarity of the instructional program students received within each school. Thus, it is possible that characteristics of our sample would not generalize to the larger population of students receiving literacy instruction in Spanish.

In addition, our findings might be an artifact of the measurement instruments we used to assess students' knowledge of Letter Sounds, Syllable Sounds, Phoneme Segmenting, Syllable Segmenting, and oral reading. We did not include any externally-developed assessments in our study, and this is a limitation that should be considered when weighing our findings. Finally, because we were interested in the relationship between early literacy skills and reading in Spanish, we limited our sample to first and second-grade students. It is possible we would have obtained different results had we included students in kindergarten or in upper grades.

Conclusion

Our findings differ from studies of English literacy acquisition, in which phonological awareness is typically found to be a critical component of literacy development (Hogan, Catts & Little, 2005; Share, Jorm & McClean, as cited in Ehri, 2001; Stahl & Murray, 1994). This study provides evidence that literacy assessment in Spanish cannot be approached identically to literacy assessment in English. The development of useful and appropriate literacy assessments for Spanish literacy programs requires research on the specific linguistic properties of the language and how these characteristics influence literacy instruction. Future research should focus on broadening our understanding of Spanish literacy development so that assessments can be developed that are representative of the Spanish literacy acquisition process and thus, allow students to accurately demonstrate their reading skills.

Given the emphasis on using data to guide instructional decision-making in schools today, it is important that assessment developers take the unique characteristics of the languages students are learning into consideration as they build assessments. We used the results of our initial studies to inform the development of alternate forms of two measure types at the Kindergarten level (Syllable Segmenting and Syllable Reading), four measure types at the first-grade level (Syllable Segmenting , Syllable Reading , Word Reading , and Sentence Reading) and two measures at the second-grade level (Word Reading and Sentence Reading). Our follow-up study provided evidence of the reliability of alternate forms of these measures, as well as additional evidence of the relation between the different measures.

Specifically, the results of our reliability study confirmed that Syllable Segmenting, Syllable Reading, and Word Reading Fluency are all significant predictors of Sentence Reading Fluency, with Word Reading Fluency accounting for the largest amount of unique variance in the regression equation. This finding lends support to the use of the Syllable Segmenting and Syllable Reading measures for students in Kindergarten and the inclusion of all four measure types at Grade 1, where student literacy in Spanish might be expected to vary tremendously, depending on experience with Spanish literacy in the prior year of schooling as well as in the home environment. By the time students reach Grade 2, particularly given the transparency and regularity of the Spanish language, the measures of Word and Sentence Reading fluency appear to be most appropriate.

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